B.Tech Even Semester Examination, May, 2025

Computer Science & Engineering

(6th Semester)

Course No: CSE-602

(Computer Networks)

Full Marks: 70
Pass Marks: 28
Time: 3 hours

Note:

1. Attempt one question taking one from each unit.
2. Begin each answer in a new page
3. Answer parts of a question at a place
4. Assume reasonable data wherever required
5. The figure in the right margin indicates full marks for the question
6. All the mathematical symbols and abbreviations have their usual meanings.

UNIT-I

1. (a) Why there is a need for layered architecture?Write down the similarities and differences between OSI/ISO Reference Model and TCP/IP Reference Model. (2+4)

   (b) What is the total delay(latency) for a frame of size 5 million bits that is being sent on a link with 10 routers each having a queuing time of 2ìs and a processing time of 1ìs.The length of the link is 2000 km. The speed of light inside the link is 2×10^8 m/s. The link has a bandwidth of 5 Mbps. Which component of the total delay is dominant? Which one is negligible? (4)

(c) Explain why protocols and standards are needed? Explain protocols and standards in context to computer network. (2+2)

2. (a) Define spread spectrum and mention its goal. Explain Frequency hopping spread spectrum (FHSS) in brief. (2+3)

(b) What is mean by performance of a network and also discuss different performance measures? (4)

(c) What is meant by multiplexing?Also, discuss various types of multiplexing. (5)

UNIT-II

3. (a) Transmitter want to transmit the message 1011 0010 0100 1011 and protect it from errors using the CRC-8 polynomial x8+ x2+ x+1.

(i) Use polynomial long division to determine the message that should be transmitted.

(ii) Suppose the leftmost bit of the message is inverted due to noise on the transmission link. What is the result of the receiver's CRC calculation? How does the receiver know that an error has occurred? (5)

(b) Mention various taxonomies of multiple-access protocols. Compare random access protocols vscontrolled access protocols vs channelization protocols. (5)

(c) Discuss the concept of redundancy in error detection and correction. Distinguish between forward error correction versus error correction by retransmission

(c) Explain the difference between connection less and connection-oriented service at the transport layer. 4

UNIT-V

9. (a) What is meant by saying that HTTP is a stateless protocol? What is the role of cache in HTTP? Compare HTTP and HTTPS. 2+2+2

(b) Mention the advantages of a hierarchical name space over a flat name space. 2

(c) Describe the working of DNS resolution (recursive vs iterative) 3+3

10 (a) What are the different types of application architectures? (5)

(b) Describe the working of a simple e-mail system. (5)

(c) What is meant by Name Space? Explain in brief about Domain Name Space (4)

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4. (a) What is the need of Flow control? Explain the common approaches for flow control in data link layer. (5)

(b) Explain Hamming Codes with an example. (4)

(c) A sender needs to send the four data items 3456, ABCC, 02BC, and EEEE.Answer the following:

i. Find the checksum at the sender site.

ii. Find the checksum at the receiver site if there is no error

iii. Find the checksum at the receiver site if the second data item is changed to ABCE. (5)

UNIT-III

5. (a) How is routing different from forwarding? Discuss the Distance vector routing algorithm with example. What is count-to-infinity problem? 1+5+1

(b) Given a network address 10.48.0.0, answer the following :

i) How many subnets may be created in this network with subnet mask /21?

ii) What is the block size for each of those subnets?

iii) State the subnet IP, range of usable host IPs andbroadcast IP of the second subnet. 1+1+3

(c) What are the messages been exchanged between a host to obtain an IPv4 address dynamically from a server? 2

6. (a) Distinguish between:

i) IPv4 & IPv6, ii) Switch & Hub 3+2

(b) A large number of consecutive IP address are available starting at 160.22.0.0. Suppose that four organizations, A, B, C, and D, request 2000, 2000, 4000, and 8000 addresses, respectively, and in that order. For each of these, give the first IP address assigned, the last IP address assigned, and the mask in the w.x.y.z/s notation. 4

(c) What do you mean by gratuitous ARP request? What is its use? 1+1

(d) How is NAT helpful in solving the depletion of IPv4 addresses? 3

UNIT-IV

7. (a) Why are transport layer protocols like TCP and UDP called end-to-end protocols? Distinguish between TCP & UDP 2+4

(b) Explain the TCP connection establishment and connection release procedure 2+2

(c) What is a port number, and how is it different from a socket address? Give the port number ranges falling in different categories 2+2

8. (a) Draw the TCP header citing field names and their lengths. Also mention the functions of each field 6

(b) What is congestion control in TCP, and why is it necessary?Explain the slow start of TCP congestion control. 2+2